WINNING IN THE COLD

WORLD CLASS DISCOM

702d MSB

302d FSB

2d FSB

602d ASB

The WAGONMASTERS common-sense guide to planning, training, and preparing for cold weather operations in Korea

DECEMBER 2001

DISCOM, 2nd Infantry Division

Historical Information

- In the Korean War
  - 8,000 cold weather casualties the first winter.
  - Decreased to 1,000 the second winter with preventative measures.
- Results of Cold Weather Injuries
  - Napoleon and Hitler both lost Russia to Cold Weather Injuries.
  - US Army lost 91,000 troops in World War II.

A Typical Cold Weather Casualty…

…is 20 years old.

…is from a southern state.

…is an E4 or below.

…has less than 18 months time in service.

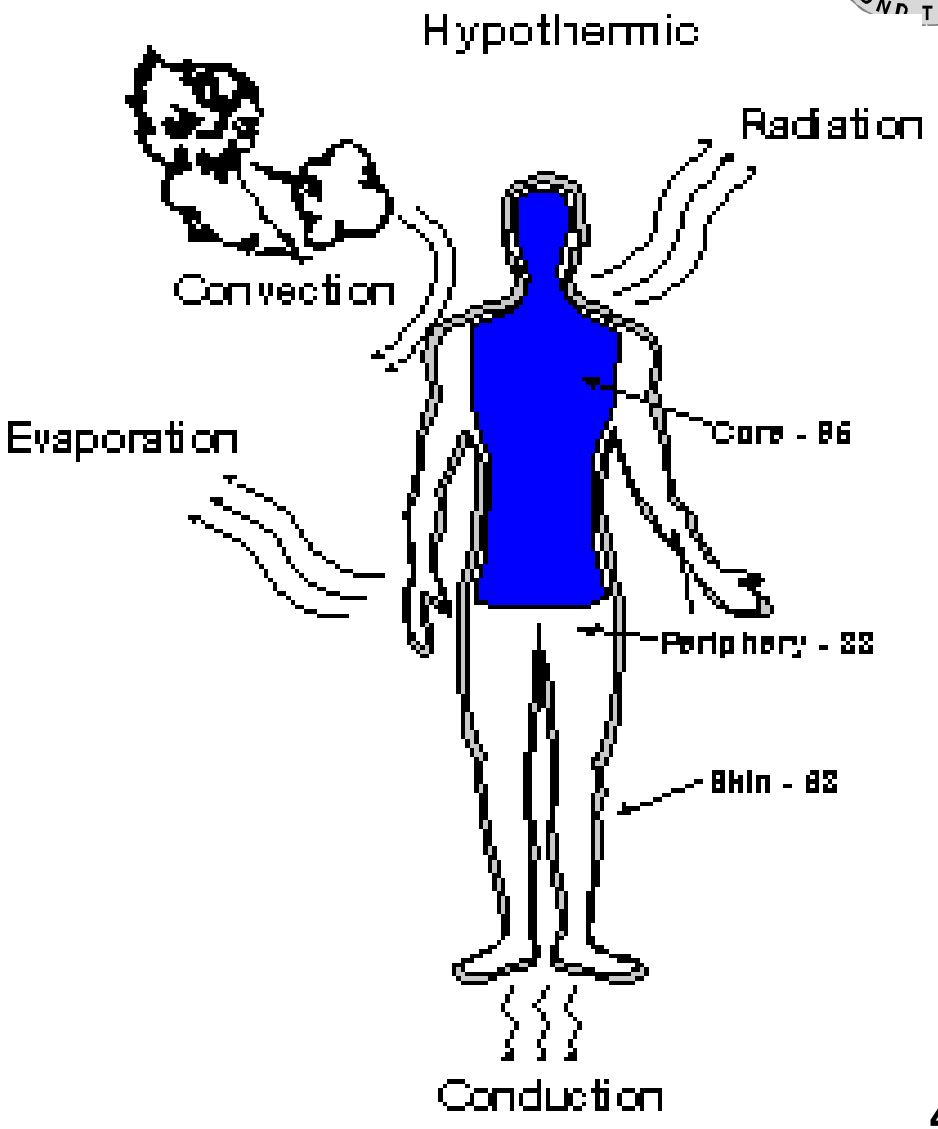
…has had a cold weather injury before.

…wears cold weather gear when not needed

…sleeps in a vehicle.

5 Methods of Heat Loss

- Evaporation
- Convection
- Conduction
- Radiation
- Respiration



5 Methods of Heat Loss

Warrior Support

SECOND TO NONE

Evaporation – Method 1

- Body heat turns liquid into gas.
- 1.5 quarts or more of water loss per day.
- Steep terrain and active maneuver contribute.
- STAY HYDRATED: Drink PLENTY of water.

Convection – Method 2

- Loss of heat through air circulation over skin.
- Wind chill cools skin faster than still air.
- COVER exposed skin.
- Take SHELTER from wind.

Conduction – Method 3

- Loss of heat due to direct contact environment.
- Clothing conducts heat.
- Sitting in the snow.
- Wet clothes = 5x the conduction.
- Immersion = 25x the conduction.
- STAY DRY!!!

5 Methods of Heat Loss

Radiation – Method 4

- Body radiates or ‘leaks’ heat through rays or waves.
- Can lose heat even in 70 degrees.
- 40-45% lost through head & neck.
- Up to 60% if hands, wrists & ankles are exposed.
- COVER exposed, high radiating areas.

Respiration – Method 5

- Air is warmed, then exhaled; result HEAT LOSS.
- Conduction in the lungs.
- QUIT BREATHING? No!!!
- Breathe through nose.
- Use a Neck Gaiter or Balaclava.

Cold Weather Injuries

Warrior Support

SECOND TO NONE

Non Freezing

- Hypothermia
- Chilblains
- Trench/Immersion foot

Freezing

- Frostbite
- Frost nip

Associated Injuries

- Snow Blindness
- Dehydration
- Carbon Monoxide Poisoning

Hypothermia

Number One Killer

- Loss of 4 or more degrees F body temp.
- Wet body contributes.

Cause

- Continued Exposure.
- Depleted energy supply.

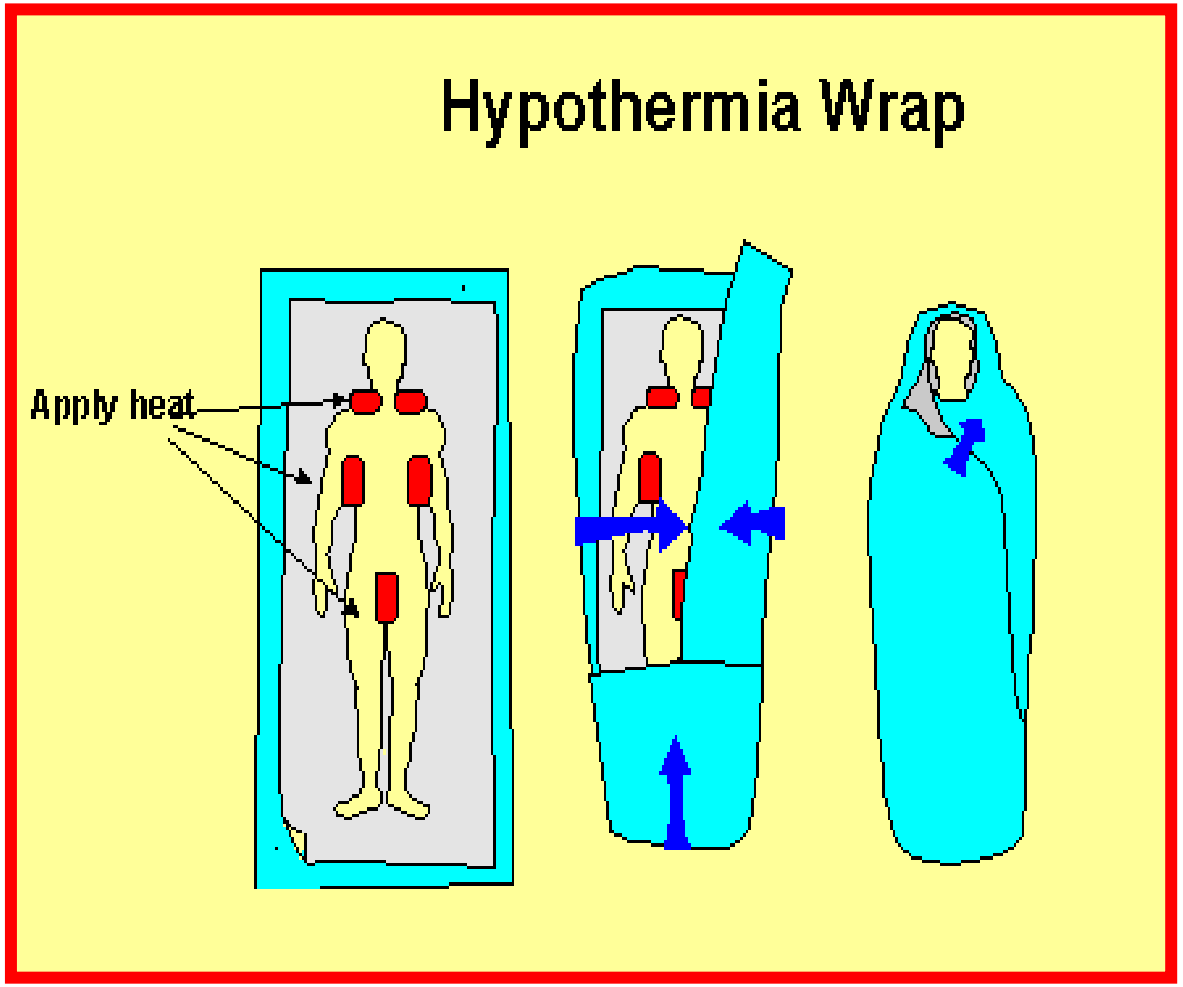
Symptoms

- Shivering.
- Slow and Shallow Breathing.
- Slow Speech.
- Loss of Coordination.
- Memory Lapse.
- Hunger, nausea, fatigue.

Hypothermia

Treatment

- End exposure.
- Warm beverages.
- Keep victim in warm, dry clothes.
- Gradually re-warm.



Field Warming Options

Passive External

- Cover the victim with dry insulating materials in a warm environment (Blankets, sleeping bags and space blankets).
- Block the wind.
- Keep victim dry.

Active External

- Apply hot water bottles, heat packs or warmed rocks to areas of high circulation -- neck, axillae and groin.
- Immerse victim in water bath, 104Fº.
- Share body heat with second person.

Chilblain

Cause

- Repeated, chronic exposure of bare skin to temps 32º-60ºF.

Sign/Symptoms

- Appear as swollen, tender, papules.
- Complaint of burning or prickly sensation.
- Redness.

Treatment

- Passive warming at room temp.
- No rubbing.
- Protect from trauma and secondary infection.

Trench/Immersion Foot

- Cause
  - Wet conditions, low temperature.
  - Prolonged contact with moisture at temps between 32º-50ºF
- Signs / Symptoms
  - Numbness and pain.
  - Swelling, tingling, itching.
  - Pale waxy skin.
  - Blistering.
- Treatment
  - Elevate, wrap in loose dressing.
  - Passive re-warming at room temp.
  - No massages or rubbing.
  - Air dry, no immersion in water.

Frostbite

1st Degree (Frost Nip)
- Partial freezing
- Stinging

2nd Degree
- Clear Blisters
- Numbness and Burning pain

3rd Degree
- Blue-gray discoloration
- Bleeding blisters

4th Degree
- Blue
- Deeply aching

Frostbite

First Degree or Frost Nip

- Most superficial form of frostbite
- No permanent CWI

– ***Signs/symptoms***

- Redness, mild swelling, pale, and edema

– ***Treatment***

- Warm immediately

Frostbite

- True freezing injury of tissues.
- Onset signaled by sudden blanching of the skin of nose, ears, cheeks, toes, followed by tingling.
- Frostbite has declared itself when these areas are painless.
- Intense coldness followed by numbness.

Frostbite

Second Degree or Superficial

- Entire epidermis.
- Skin redness in fair individuals.
- Grayish discoloration in darker skinned individuals.
- Clear blister formation at 24-36 hours followed by sheetlike desquamation.
- Persistent cold sensitivity in the area.

Frostbite

Third and Fourth Degree or Deep

- **Loss of sensation with pale, yellow, waxy look if unthawed.**
- **Poor capillary refill.**
- **Tissue loss.**
- **Hemorrhagic bullae form in 3rd degree injuries at 12-35 hours unless re-warming is rapid.**
- **Red discoloring 1-5 days after injury.**
- **4th degree characterized by gangrene, necrosis, auto-amputation.**
- **Permanent anatomic and functional loss.**

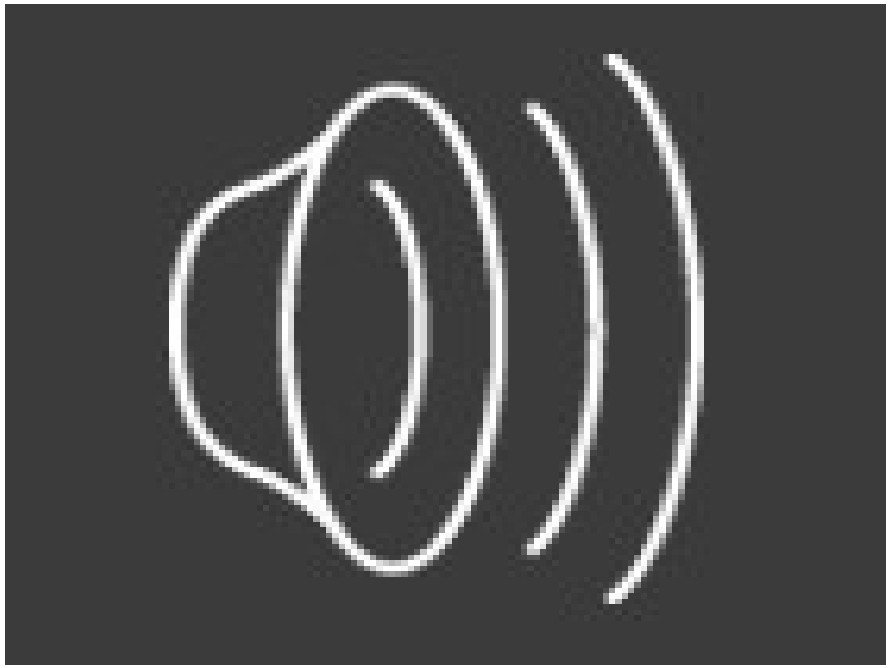
Frostbite Treatment

- RAPID re-warming at temps slightly above body temperature is the single most effective treatment.
- Re-warm until the skin is pliable.
- NO dry heat -- stoves or campfires.
- No re-warming with exercise or rubbing.
- Do not re-warm in the field if there is a risk of refreezing.
- Protection from further injury, pad all affected areas.
- Loosely wrap with gauze and elevate.
- Remove wet and constrictive clothing.

Snow Blindness

Cause

- Light reflection off snow.



Signs and Symptoms

- Red, itchy eyes.
- Sensitivity to light.

Treatment

- Stay indoors.
- Rest eyes.
- Bandage eyes.

Prevention

- Wear sunglasses.

Carbon Monoxide Poisoning

- ***Terminology***
  - Carbon monoxide is a colorless, odorless gas produced by gasoline and diesel engines, and faulty heaters.
- ***Cause***
  - High concentrations gas build up due to poor ventilation.
  - Sleeping in parked vehicles with engine running.
- ***Signs and symptoms***
  - Headache.
  - Weakness and dizziness.
  - Nausea.
- ***Treatment***
  - Fresh air.
  - If not breathing, perform mouth to mouth resuscitation.
- ***Prevention***
  - Adequate ventilation in tents/ fire guards at all times!
  - Do not sleep in running vehicles!!!

Dehydration

- Cause - loss of body moisture
  - Dry air.
  - Cold diuresis.
  - Not enough fluid intake.
- Signs/symptoms
  - Dry lips and mouth.
  - Dark yellow or orange urine.
  - Fatigue.
- Treatment/prevention
  - Drink frequently.
  - 1/2 –1 qt per hour during heavy work load.
  - Timed drinking.
  - Don’t use alcohol or tobacco.

CW Injury Prevention Tips

- ***Principles of Care***
  - Frequent sock changes
    - In WW1, the Brits decreased trench foot cases from 29,000 in 1915 to 443 in 1917 by sock changes.
  - Cover head and neck, 80% of heat loss.
  - Use synthetic fibers, natural fibers retain moisture and have poor wicking ability.

- ***Modification of Risk Factors***
  - Adequate nutrition: 3000-4000 cal/day.
  - Adequate hydration and rest.
  - Adequate clothing: loose, layered, windproof and changed often.
  - Buddy and supervisor checks.
  - Previous cold weather exposure and experience.

Shelter

Shelter from weather is critical.

- The standard shelter is the tent, but improvised shelters (snow caves, snow trenches, lean-tos, etc.) can be constructed from local materials. Use existing buildings when possible.
- Use a tent liner for better insulation.
- In tents, soldiers should sleep in long underwear and socks with all other clothing hung up to dry.
- Ensure adequate ventilation to avoid moisture build up in clothing and sleeping bags.

Heaters

- ***<u>There are several heaters for use inside tents. The type of heater required depends on the size of the tent or shelter.</u>***
  - Usually, the Yukon stove is used to heat the Arctic 10 Man Squad Tent, 5 man tents and GP small tents.
  - The Squad stove M1950 is used in improvised shelters or small tents housing 2 to 5 men.
  - Larger capacity stoves are available for the bigger tents.
- ***<u>Care must be used to prevent melting the frozen ground beneath or around the stove.</u>***
  - By using a tent liner, removing loose snow and ice from the ground before setting up the tent, and preventing the tent from overheating, melting can be minimized.
  - If available, plywood tent flooring and metal trays under the stove can be used to reduce melting.
- **<u>Ensure that stoves have adequate exhaust from the shelter.</u>**

Cold Weather Sleep Tips

- **Prepare an insulation layer between ground and sleeping bag.**
- **In improvised shelters, only boots and the outermost clothing layer should be removed. Place clothing under the sleeping bag where it can add insulation without accumulation moisture from the body.**
- **Relieve yourself before you go to sleep.**
- **Eat a candy bar or part of an MRE before you sleep to give you energy which will help keep you warm.**
- **Fill canteen and put in your sleeping bag so water won't freeze.**
- **Under extremely cold conditions, wipe off boots and put in the sleeping bag. This will allow your boots to stay warm.**

Dressing for the C O L D

- Keep Clothing Clean

Dirt and grease block up the air spaces in your clothing and reduce the insulation value.

- Avoid Overheating

Sweat can freeze on outer layers. Stay dry, moisture will decrease the insulating ability of your clothing.

- Wear Clothing in Layers

Loose clothing allows air spaces to help trap warm air without restricting blood circulation. Good blood circulation helps to prevent frostbite.

- Keep Clothing Dry

You've got to keep your clothing dry, from the outside as well as from the inside.

Cold Weather Uniform (ECWCS)

Layering System

- The first layer: Poly propylene underwear and either the green or black issued socks.
- The second layer: bear suit.
- The third layer: field jacket liner (optional, but keep it handy).
- The fourth layer: GORTEX parka and pants.

Additional Items

- Neck gaiter and balaclava:
  - Used for head and neck.
- GORTEX parka hood:
  - Can also be worn with the kevlar helmet.
- Black, vapor barrier boots:
  - Ensure the boots are dry. Wick water out with old socks if wet. The tops of the worn wool socks should be turned down over the cold weather boots.
- Cold weather mittens:
  - Ensure they fit loosely to allow circulation and ventilation.

6 Keys to Healthy Feet

- Get into a warm area if possible. Remove your boots and socks. Dry your feet, especially between your toes.
- Use foot powder.
- Massage your feet for about five minutes increasing circulation.
- Put on a dry pair of socks.
- Wipe out the inside of your boots to dry.
- Do this every 4 hours.

“Mickey Mouse Boots”

- When to use: Anytime the temperature is below freezing and your duty requires you to be outside most of the time (i.e., on guard duty, in a fox hole, etc).
- Wear only one pair of socks.
- Wick out excess water.
- Do not blow up by mouth.
- Do not wear damaged boots.

Protect Your Fingers

- Don’t wear gloves or mittens that are too tight.
- Allow blood to circulate freely.
- Failure to do so will cause hands to become cold, numb, or stiff.

Sustaining Performance

- Positive Leadership and the Right Attitude (Part 1):
  - Leaders are responsible for prevention of cold injury.
  - Newly assigned individuals, who have little or no cold-weather training and experience, often sustain cold injuries.
  - Soldiers need to be taught that when it is cold, tasks may be more difficult, but they are not impossible.
  - Leaders can build this confidence in their soldiers by having them practice tasks and survival skills outdoors in the cold, and by conducting cold-weather training exercises.

Sustaining Performance

- Positive Leadership and the Right Attitude (Part II):
  - Leadership must emphasize by example to demonstrate that cold conditions are beatable.
  - Direct supervision should be emphasized.
  - Use the buddy system to maintain communication, and to watch for cold injuries.
  - Keep soldiers busy and physically active. Plan operations carefully to avoid unnecessary periods where troops are left standing in the open.
  - Use hot food to improve morale.
  - Allow soldiers more time to accomplish tasks and more discretion regarding how to accomplish them.

Sustaining Performance

- Limit Exposure
  - Many tasks can be divided into shorter segments to allow re-warming breaks: Guard, Maintenance, etc.
  - For tasks requiring work without gloves, brief re-warming periods in a heated shelter or even time spent with the gloves replaced may maintain sufficient manual dexterity that the task can be completed.
  - It may be necessary to complete the task using a two-team approach, where one team works while the other re-warms.
  - Work should be planned to avoid extended periods of inactivity (e.g. in formation or awaiting transportation) while troops are outside in the cold.

Key Points

- **Shelter from the elements is secondary to defending against enemy actions.**
- **Eat and drink more food and water than normal.**
- **Be prepared for sudden weather changes.**
- **Avoid cold injuries by using a buddy system and frequent self-checks.**
- **Immediately treat persons showing any sign/symptom of cold injury.**
- **Sick, injured, and wounded individuals are very susceptible to cold injuries.**
- **Each soldier should carry an individual cold-weather survival kit at all times.**
- **Drivers and passengers should always have a sleeping bag and extra cold-weather clothing when traveling by vehicle away from the unit bivouac location.**

Separated from Your Unit

- **Keep calm**
  - **You may only be disoriented. Stop, look and listen for signs of the main unit. Attempt to retrace your path back to your last known position.**
- **Keep together**
  - **Groups must not split up. If scouting parties are required, they should consist of at least two soldiers who go only short distances ahead and mark their trail very clearly.**
- **Keep warm**
  - **Assemble shelters whenever stopping, even if only for a short time. Whenever possible, use wood or other locally available fuel for fires and conserve POL supplies. Burning a single candle inside a tent or vehicle can provide enough heat to keep the occupants warm.**
- **Keep fed and hydrated**
  - **Collect all individual food and water supplies and institute rationing.**
- **Keep safe**
  - **If travel on frozen rivers or lakes cannot be avoided, stay near the banks, do not stand close together and watch for spots of unsupported ice resulting from changes in water level.**

Cold Weather Survival Kit

- Waterproof matches and fire starter (eg. Candle, magnesium match, lighter).
- Signaling devices (eg. Mirror and whistle).
- Knife.
- Pressure bandage, cold-climate lip balm, sunglasses.
- Compass.
- Water container (metal for use in fire).
- Small amount of concentrated food (eg. MRE or trail mix).
- Foil survival blanket (NSN 7210-00-935-6667).

Wind Chill Chart

Warrior Support

SECOND TO NONE

ACTUAL TEMPERATURE (°F)

WIND SPEED (IN MPH)	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	EQUIVALENT CHILL TEMPERATURE (°F)											
CALM	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	3	-9	-21	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124
25	30	15	0	-15	-29	-44	-59	-74	-89	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-22	-37	-53	-69	-85	-101	-117	-132	-148
	LITTLE DANGER				INCREASING DANGER					GREAT DANGER		
	(In less than 5 hrs with dry skin. Greatest hazard from false sense of security)				(Exposed flesh may freeze within 1 minute)					(Exposed flesh may freeze within 30 seconds)		

(WIND SPEEDS GREATER THAN 40 MPH HAVE LITTLE ADDITIONAL EFFECT)

To determine the windchill temperature, enter the chart at the row corresponding to the windspeed and read right until reaching the column corresponding to the actual air temperature.

Wind Chill Category

Work Intensity	Little Danger	Increased Danger	Great Danger
High **Digging foxhole, running, marching with rucksack, making or breaking bivouac**	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0 °F (-18°C); Increased hydration	ECWCS or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0 °F (-18°C)	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin
Low **Walking, marching without rucksack, drill and ceremony**	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10 °F (-12°C); Full head cover below 0 °F (-18°C). Keep skin dry -especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
Sedentary **Sentry duty, eating, resting, sleeping, clerical work**	See above; Full head cover and no facial camouflage below 10 °F (-12°C); Cold-weather boots (VB) below 0 °F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

Further Reading

- FM 31-70, Basic Cold Weather Manual
- FM 31-71, Northern Operations
- FM 31-72, Mountain Operations
- FM 21-10, Field Hygiene and Sanitation
- FM 21-11, First Aid for Soldiers
- TC 21-3, Soldiers Handbook for Individual Operations & Survival in Cold Weather Areas
- US Army Northern Warfare Training Center, Fort Greely, Alaska, Winter Operations Manual

Bottom Line

Wagonmasters that plan, train, and prepare for the cold…

WILL WIN IN THE COLD!!